

# Math-Related Professions

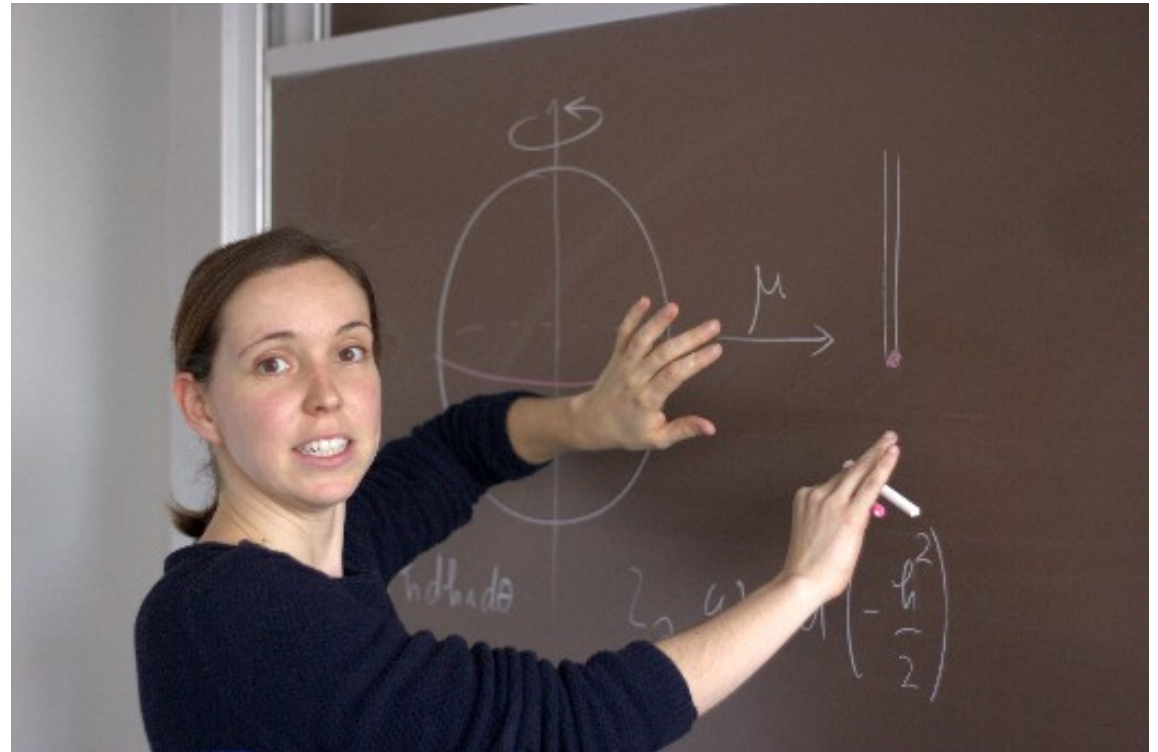
Path:

College, Graduate school (4-6 years), Postdoctoral researcher (3 years), Professor

You get to:

Come up with new math!

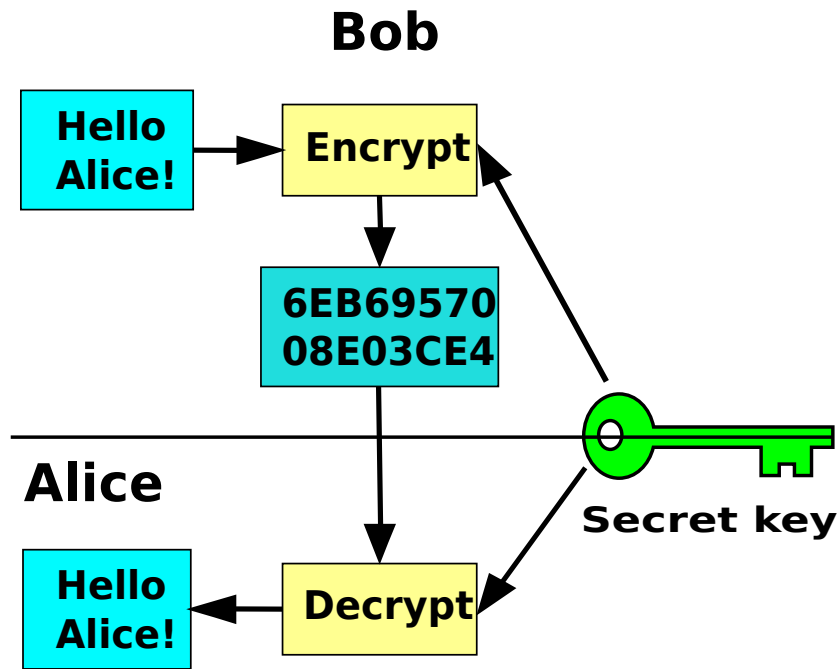
Much instability at the outset, but once you have tenure, very stable.



## Mathematician/Professor

# Cryptologist

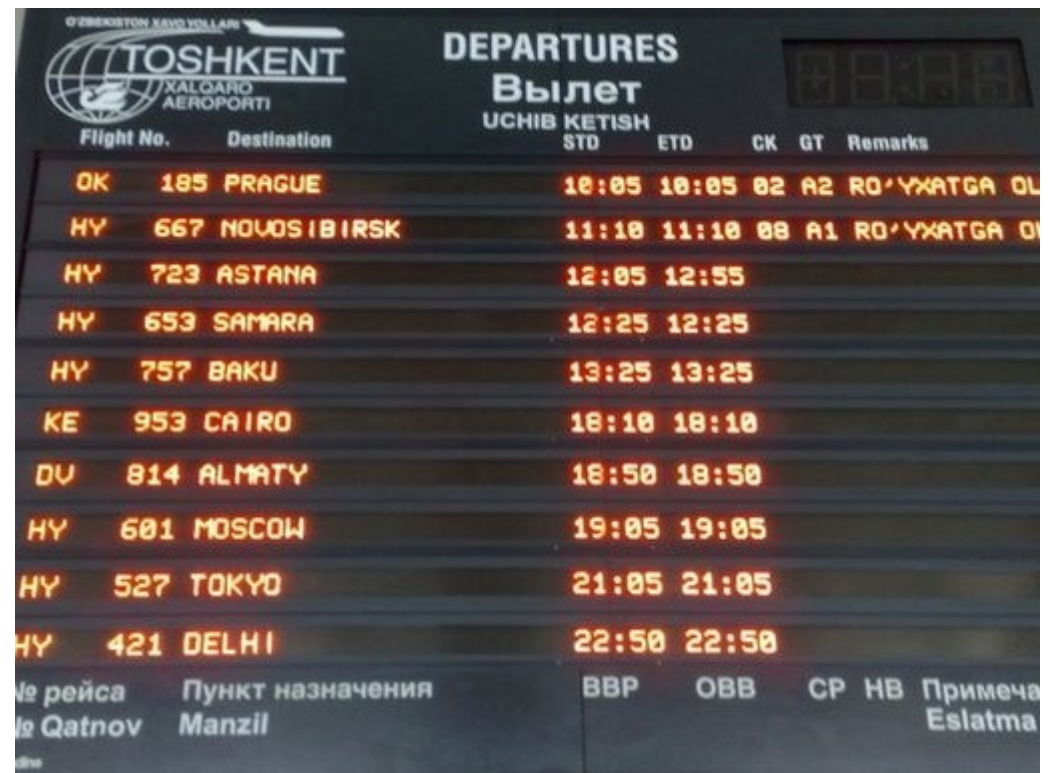
## National security agency



- Come up with ways to transmit information securely, and analyze your methods for weaknesses.
- Path: enter at any level, after completing college in computer science, math, or related fields. Might need to be a citizen.

# Operations Research Analyst

- Develop the most efficient, cost-effective solutions to organizational operations and problems: strategy, forecasting, resource allocation, facilities layout, inventory control, personnel schedules, and distribution systems
- What sorts of questions do you think an OR-analyst might worry about?



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OK 185	PRAGUE	18:05	18:05	02	A2	RO'YXATGA OL
HY 667	NOVOSIBIRSK	11:10	11:10	08	A1	RO'YXATGA OL
HY 723	ASTANA	12:05	12:55			
HY 653	SAMARA	12:25	12:25			
HY 757	BAKU	13:25	13:25			
KE 953	CAIRO	18:10	18:10			
DU 814	ALMATY	18:50	18:50			
HY 601	MOSCOW	19:05	19:05			
HY 527	TOKYO	21:05	21:05			
HY 421	DELHI	22:50	22:50			

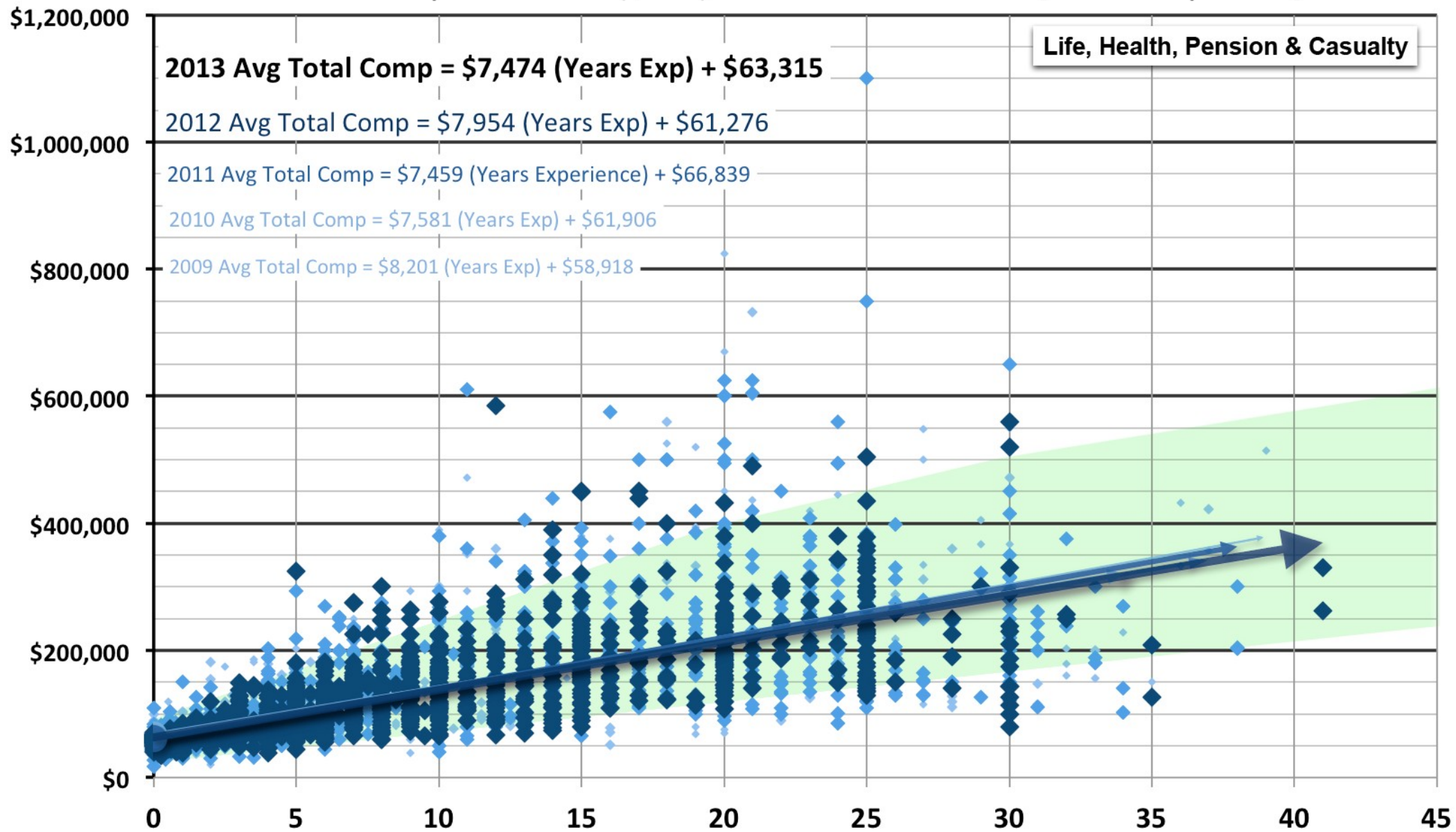
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# Actuary

- There are lots of actuary jobs out there!
- Steps to becoming an actuary:
  - Take lots of math and programming (if your school has it) in high school.
  - Major in math, finance, engineering, physics, computer science, or something similarly quantitative- some colleges even have actuary tracks
  - Most employers require you to complete 2 (of 5-9) actuarial exams before you start working for them.
- Actuaries use probability and statistics to assess the risk of death, injury, and other misfortunes that someone might buy insurance against.
- Many are employed by insurance companies and the government.
- Actuaries also act as consultants that help companies with risk and asset management.

# Actuarial Salaries vs. Years Experience

Total Compensation (\$US) = Base + Bonus [All Disciplines]





# Climatologist or Atmospheric Dynamics Scientist

Model the way the earth's atmosphere changes to better predict the weather... or try to understand climate change.

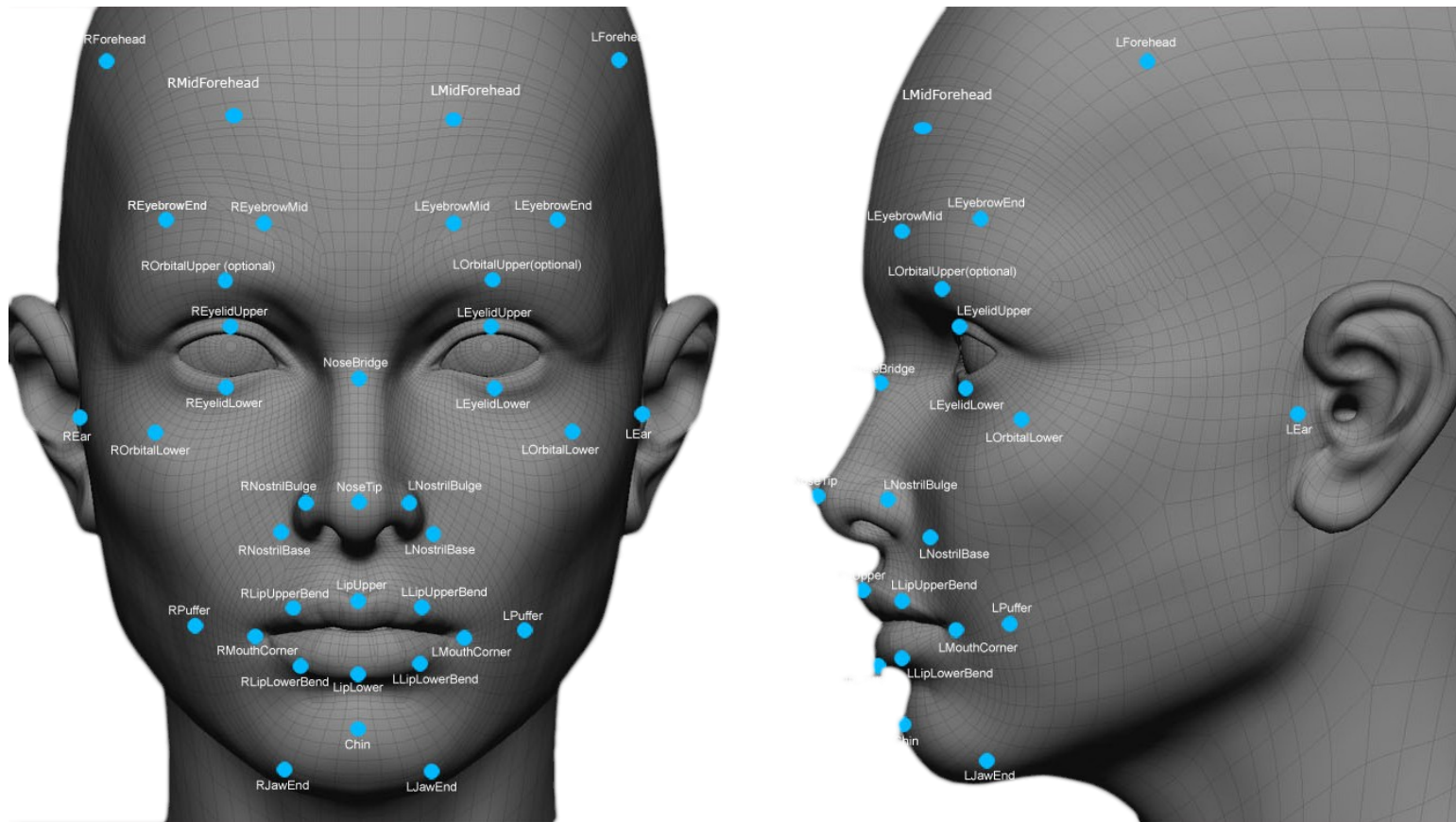


Path to being a climatologist:

- Undergrad in meteorology/climatology, physics, engineering, or math.
- Opportunities for entry-level jobs.
- If you want to do research, you'll likely go to graduate school. You'll probably take dynamics classes (a type of math) in graduate school.

# Computer Scientist

Designs and develops algorithms. Proves correctness and efficiency of their algorithms.

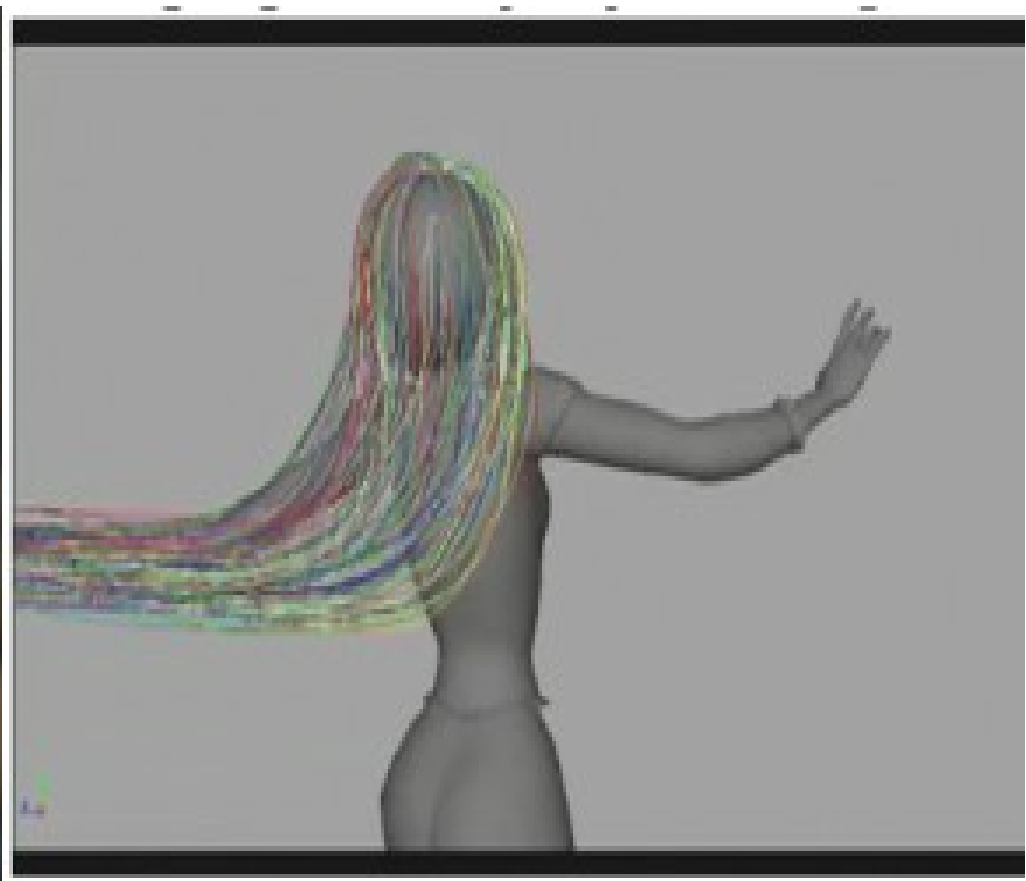


Example: How can you make a computer recognize faces?

# Animation

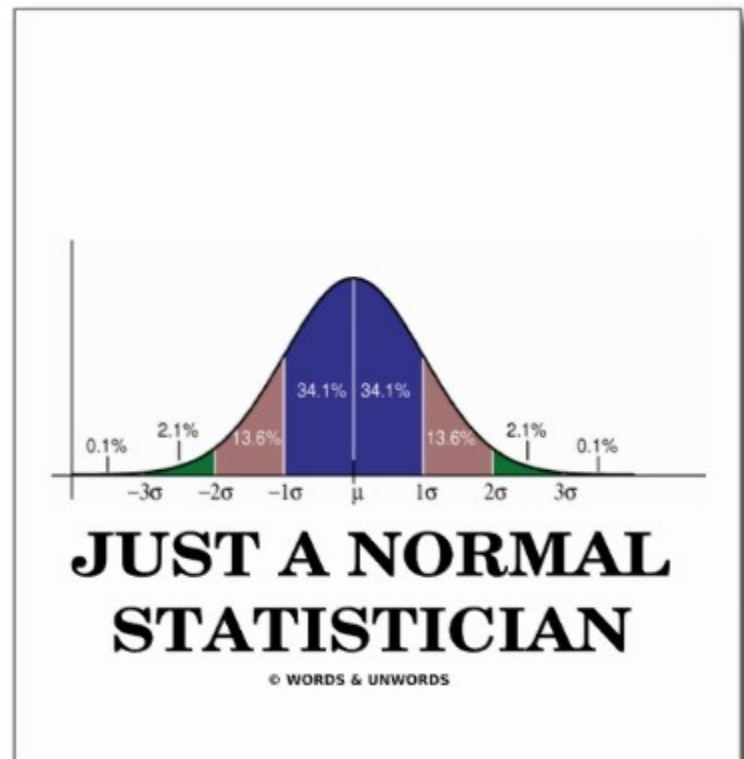
Animators work with software developers to make accurate simulations of things like fire, hair, and water.

In Tangled, 173 hairs were used to create simulations of the hair's movement!

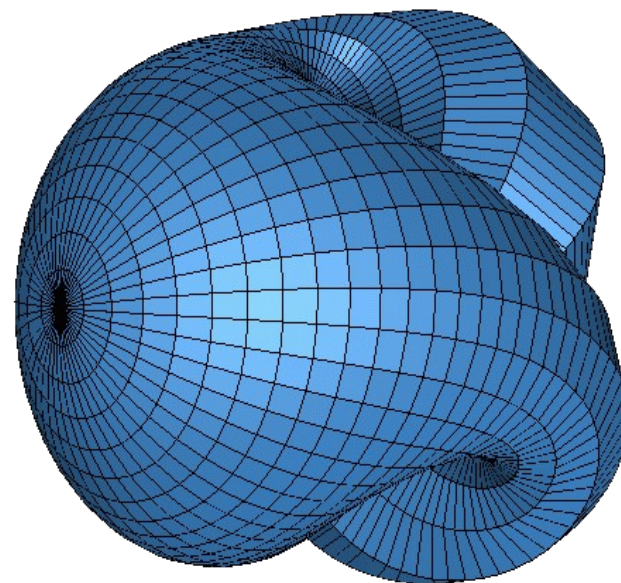
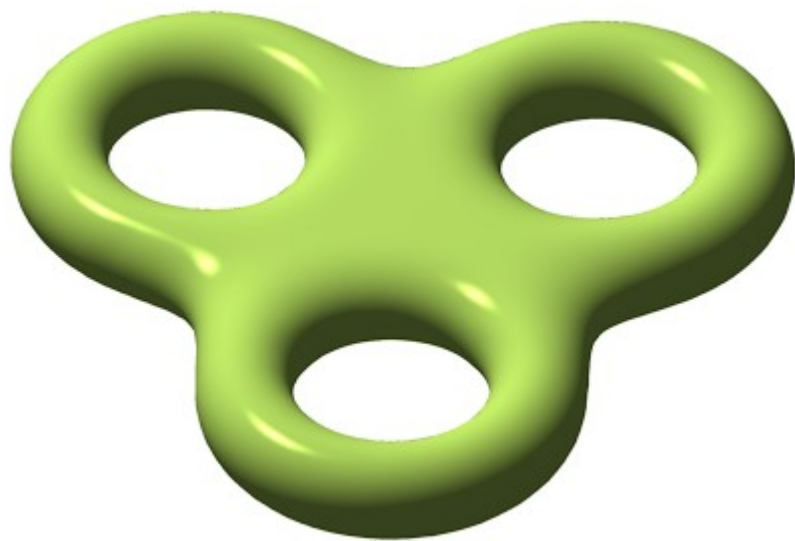
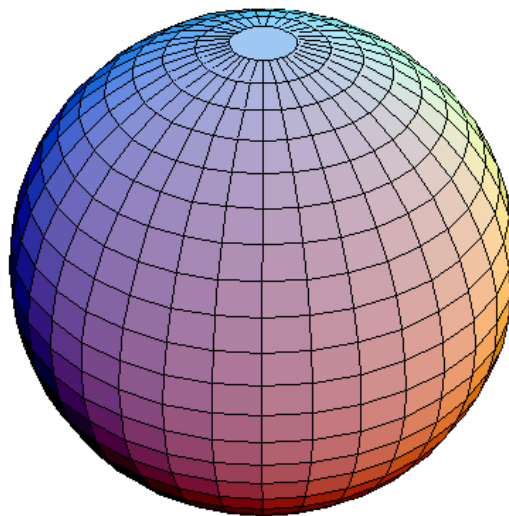
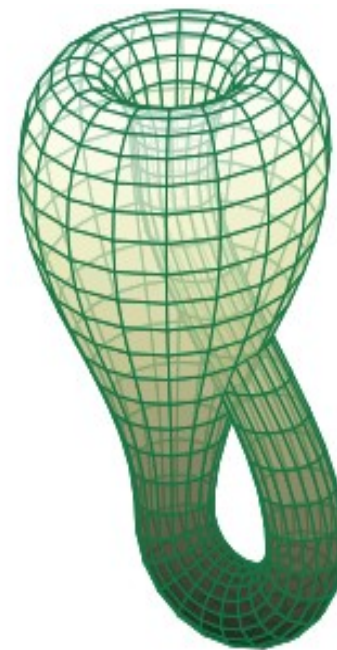
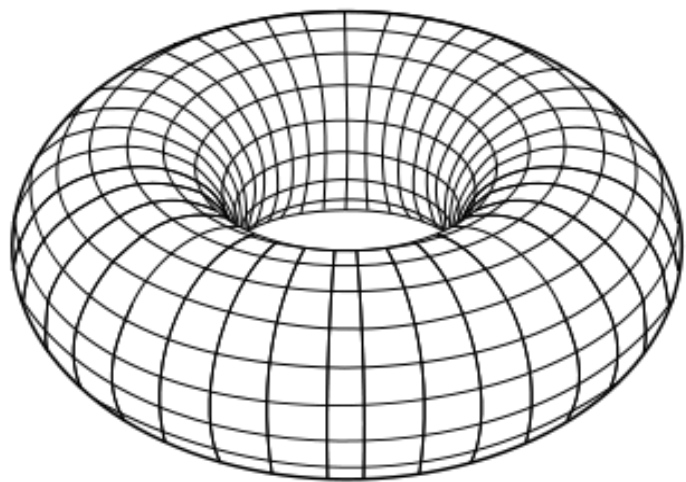


# Statistician

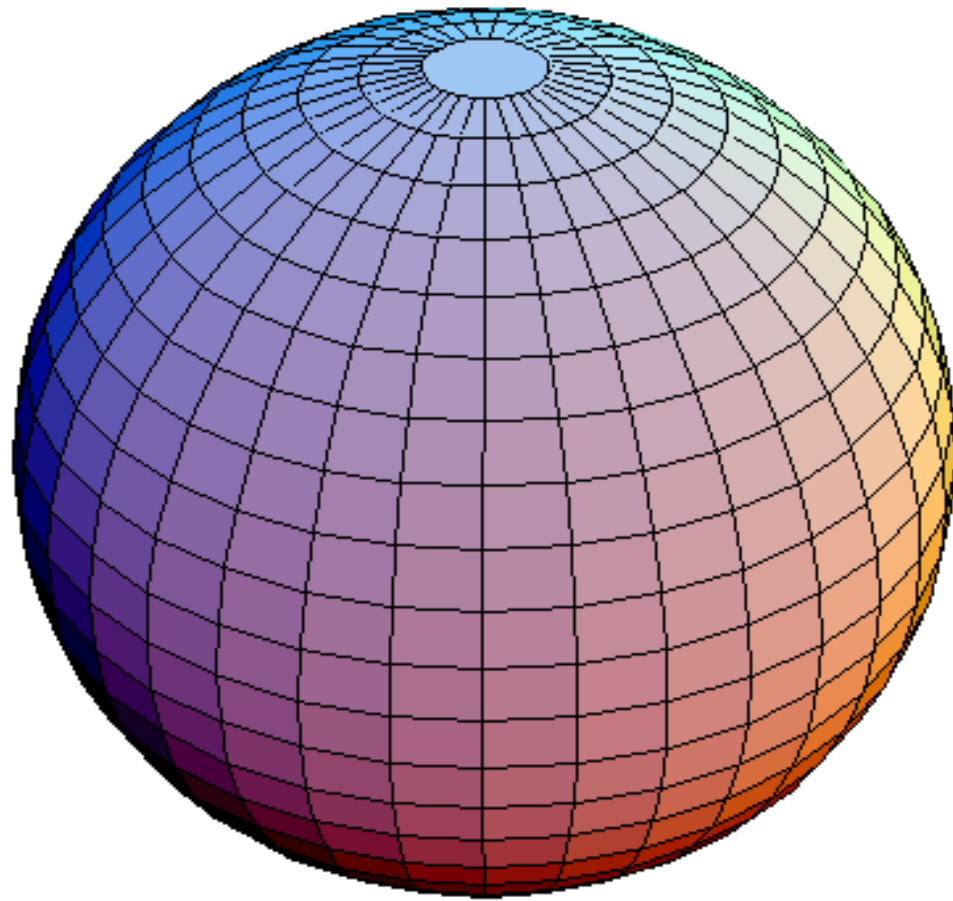
- Statisticians use statistical methods to collect and analyze data and help solve real-world problems in business, engineering, the sciences, or other fields.
- Entry-level statistics jobs will require a masters in statistics.
- Jobs are projected to grow by 27% from 2012 to 2022.



# Surfaces

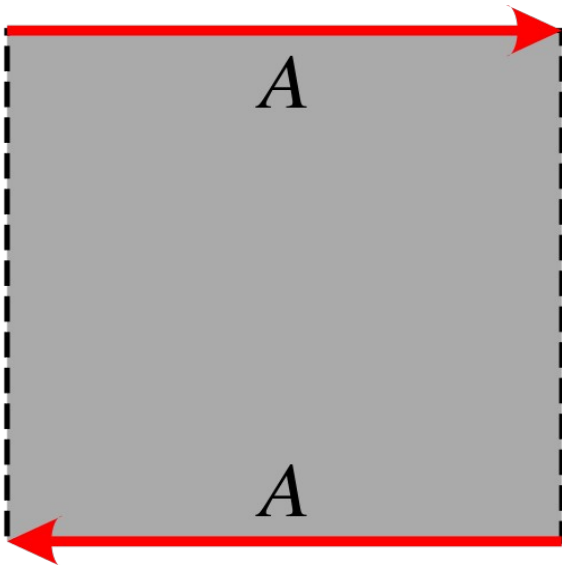
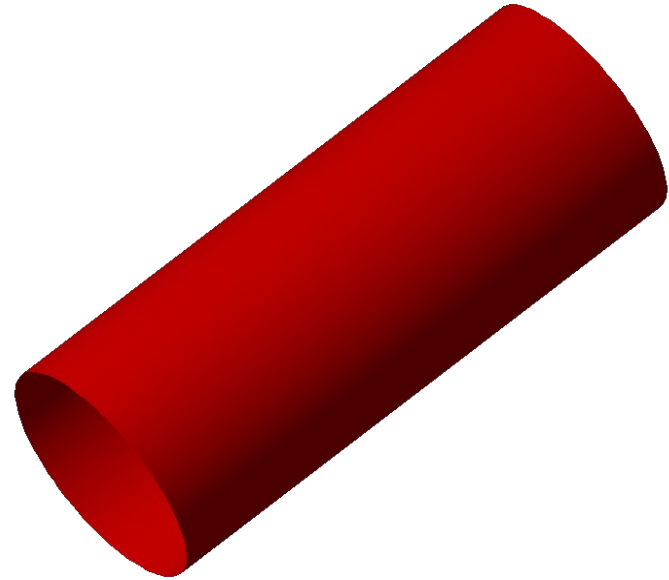
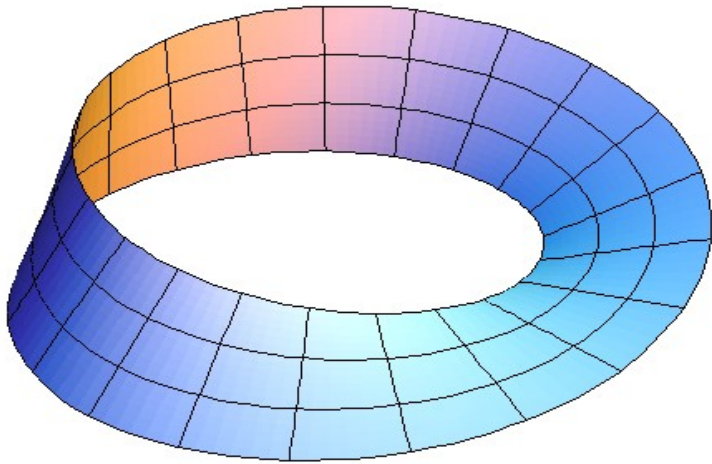


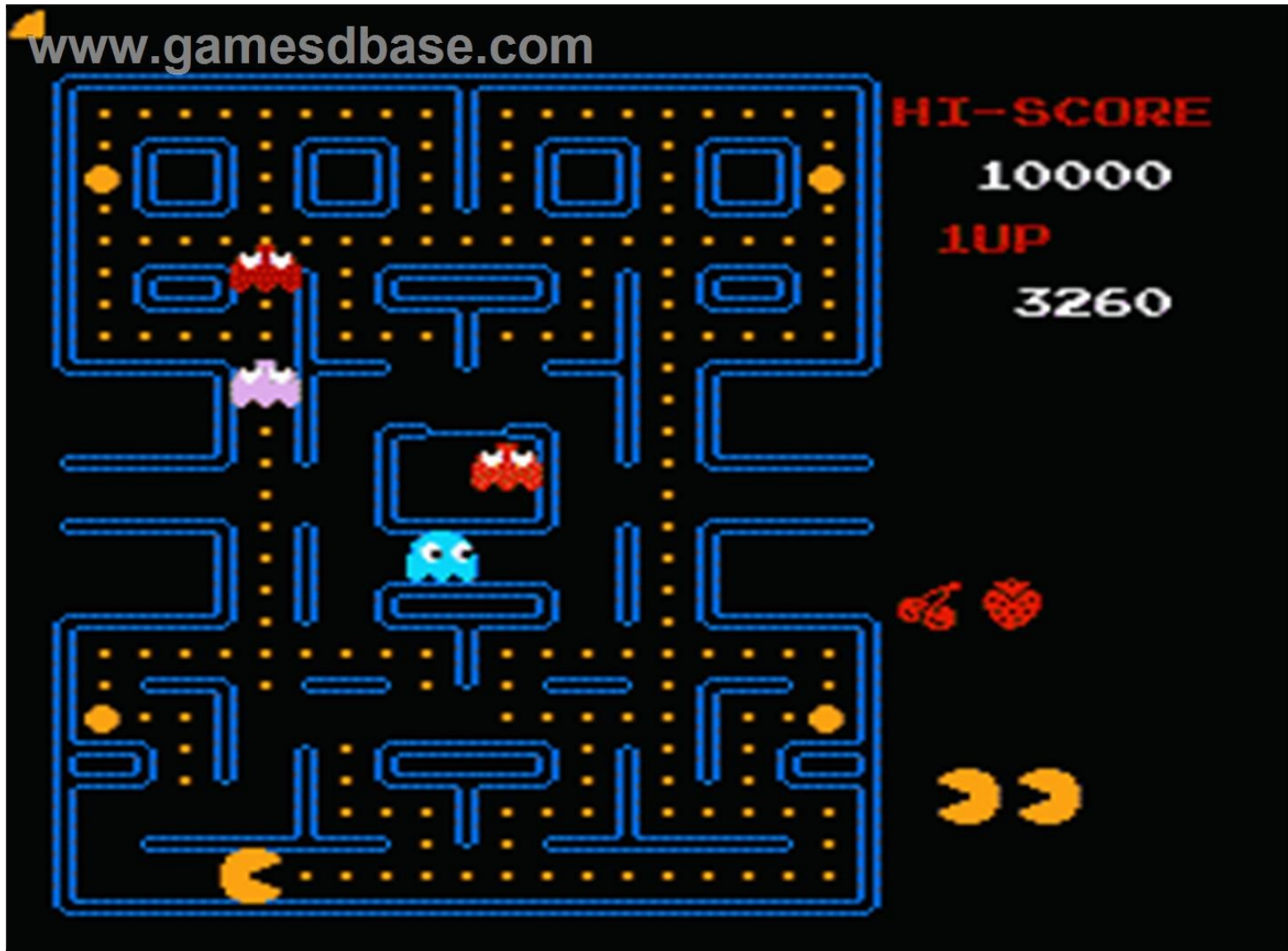
# Sphere





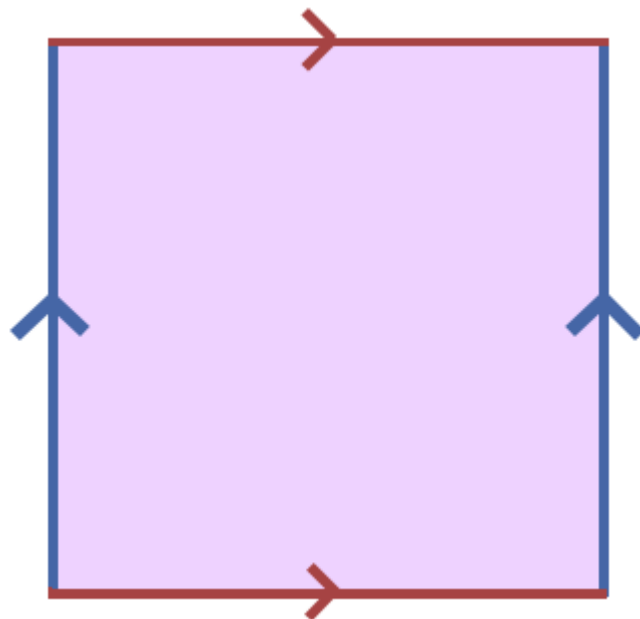
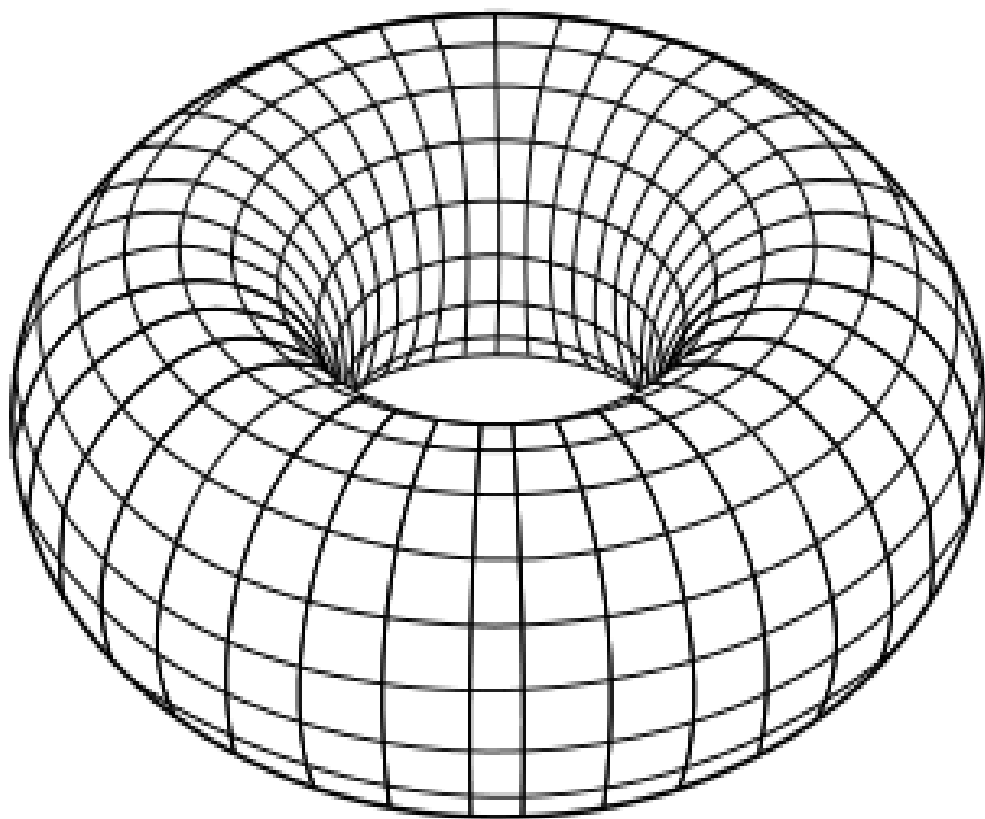
# Annulus/Cylinder and Mobius Band



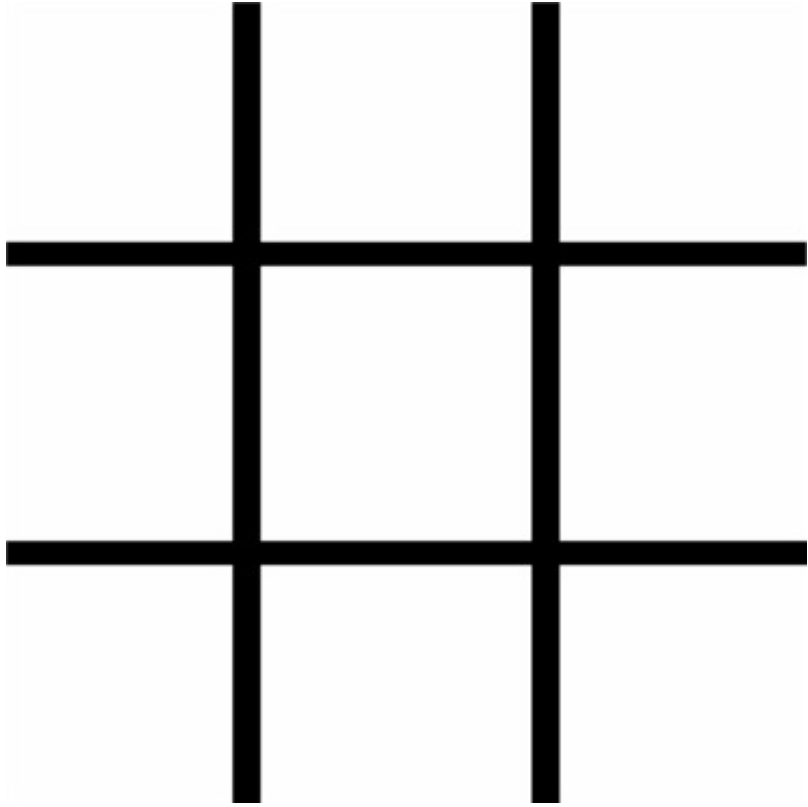


Is Pacman played on a cylinder or a mobius band?

# Torus



# Tic-Tac-Toe on the Torus

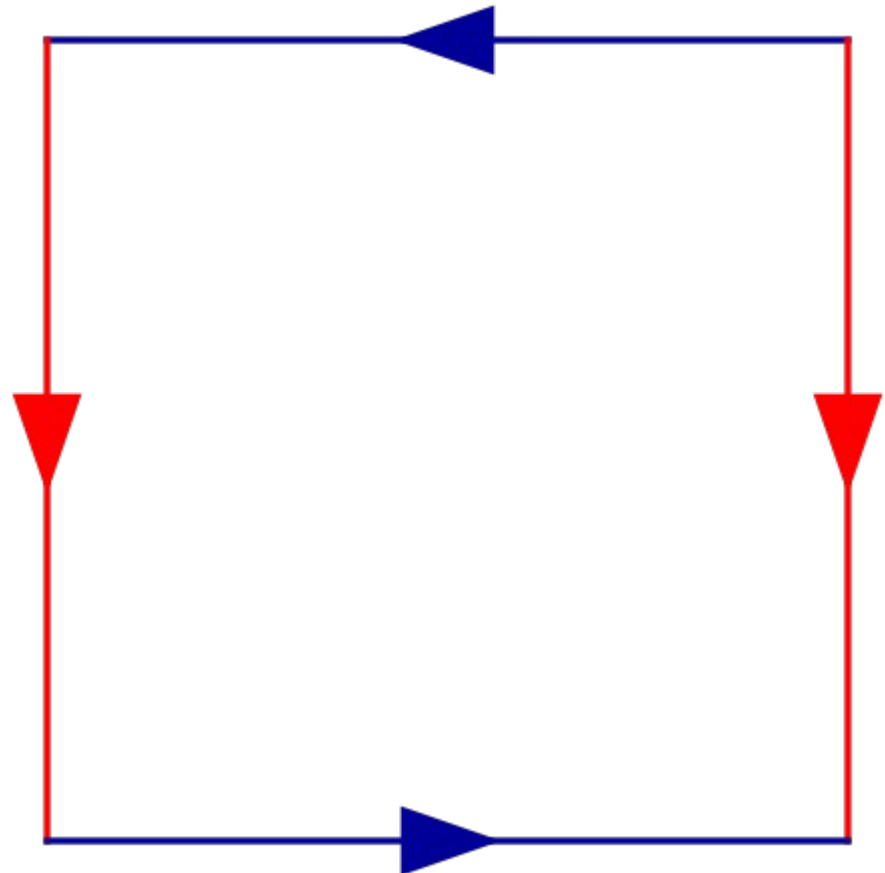


- Check out “Torus Games” by Jeff Weeks for fun games to play on the torus, including mazes and billiards.
- Is there a winning strategy for the first player of torus tic-tac-toe? What if your first piece must be placed in the lower left-hand corner?

# Klein Bottle



- First described in 1882 by Felix Klein



# Thank you!

An entertaining and approachable book, which talks about surfaces:

“The Shape of Space” by Jeffery Weeks

Good information about opportunities in math, aimed at high school students:

<http://www.ams.org/programs/students/students/>